



Environmental Studies Program National Overview

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Science for Informed Decisions



Mission

To provide the information needed to identify, assess, and manage impacts from offshore energy and marine mineral exploration, development, and production activities on human, marine, and coastal environments



- **Oil and Gas**
 - 5 year Program
- **Renewable Energy**
 - Site identification through stakeholder input and state task forces
- **Marine Minerals**
 - Negotiated agreement with state and local entities

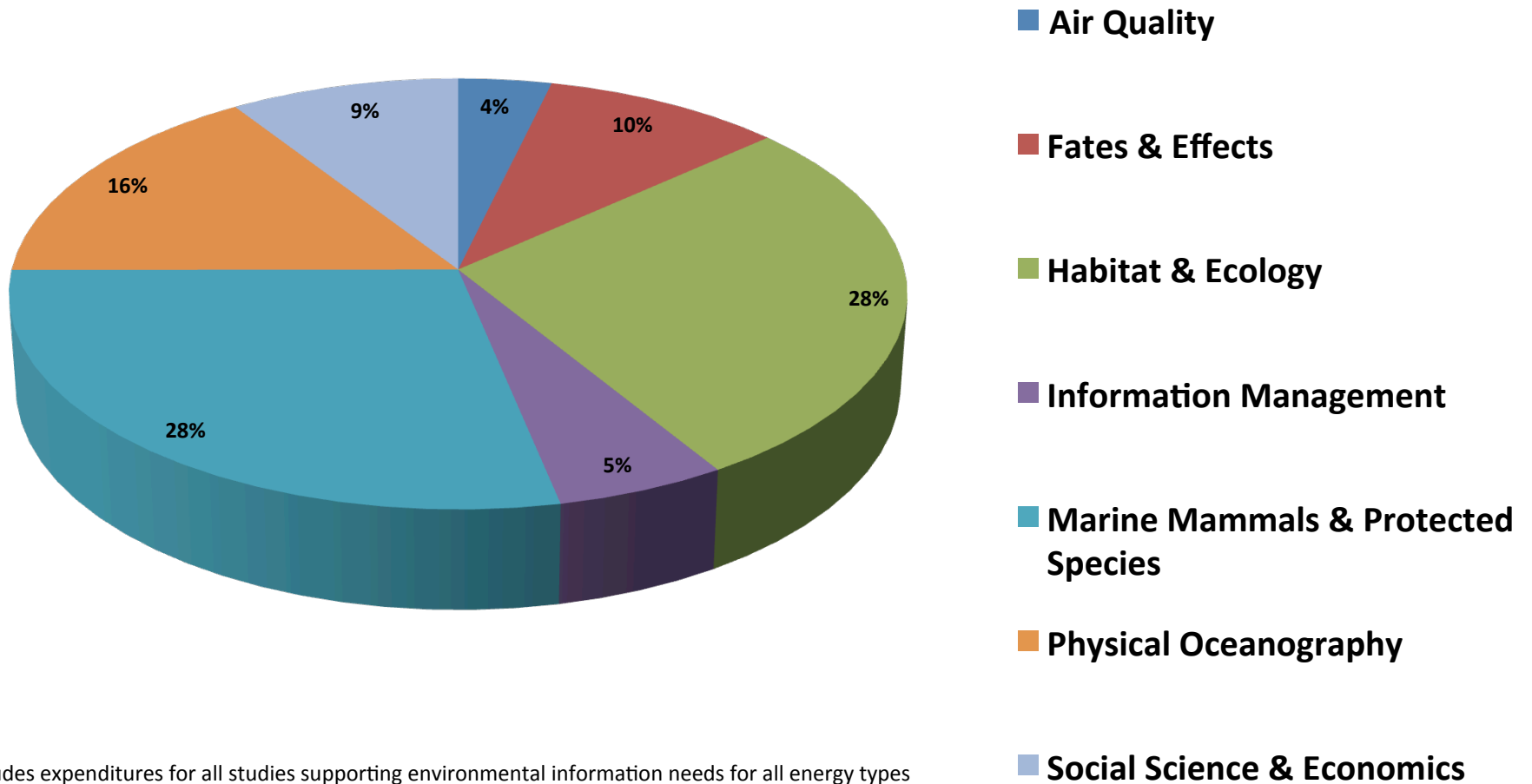


Types of Studies

- Baseline
- Cause and Effect
- Monitoring

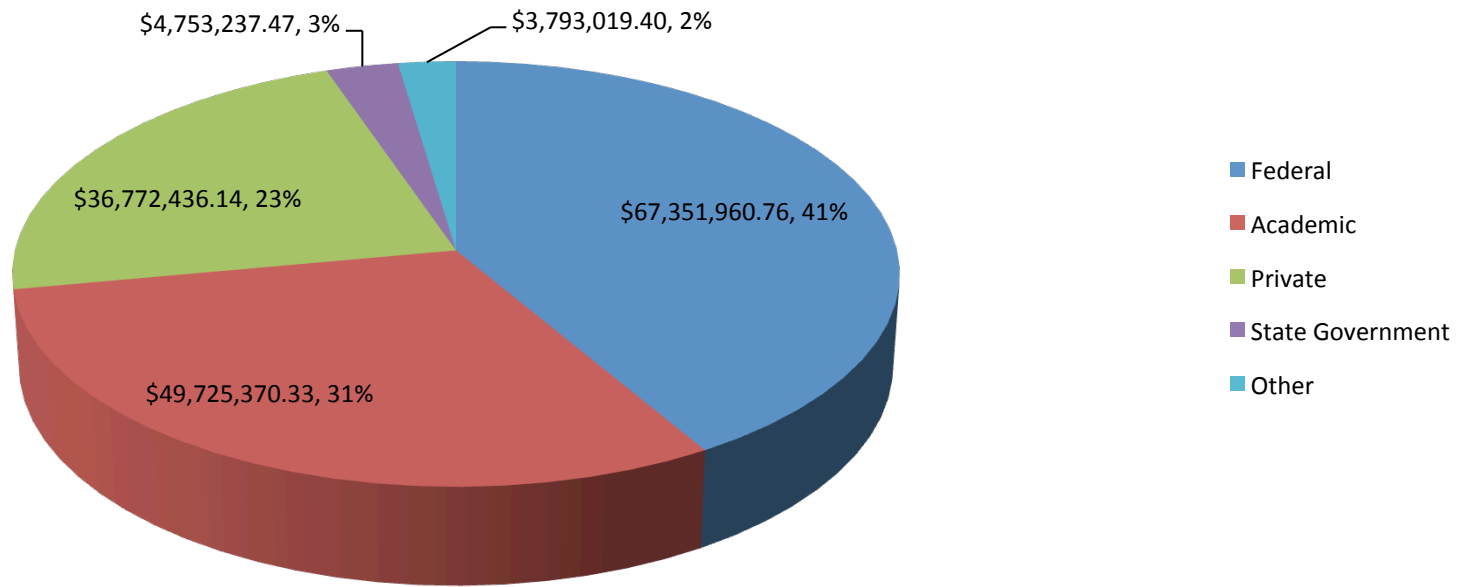


Environmental Studies Program Funds by Discipline FY 2011-2015 Cumulative



Includes expenditures for all studies supporting environmental information needs for all energy types and marine minerals .

Environmental Studies Program Funds by Vendor Type FY 2011-2015 Cumulative



Total Expenditures = \$162,396,024.10

Combines :-

Consideration of Use

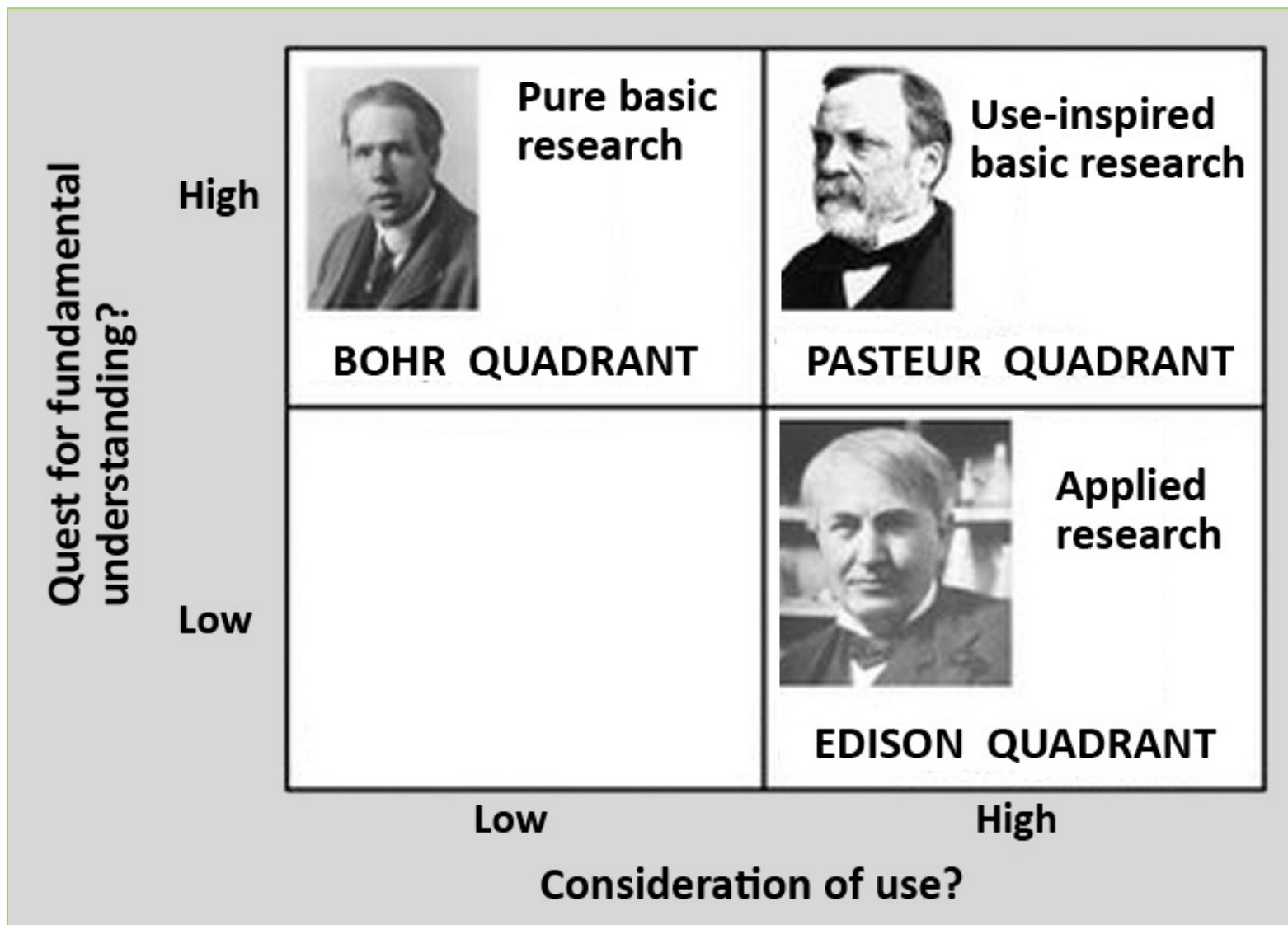
and

Quest for Fundamental Understanding

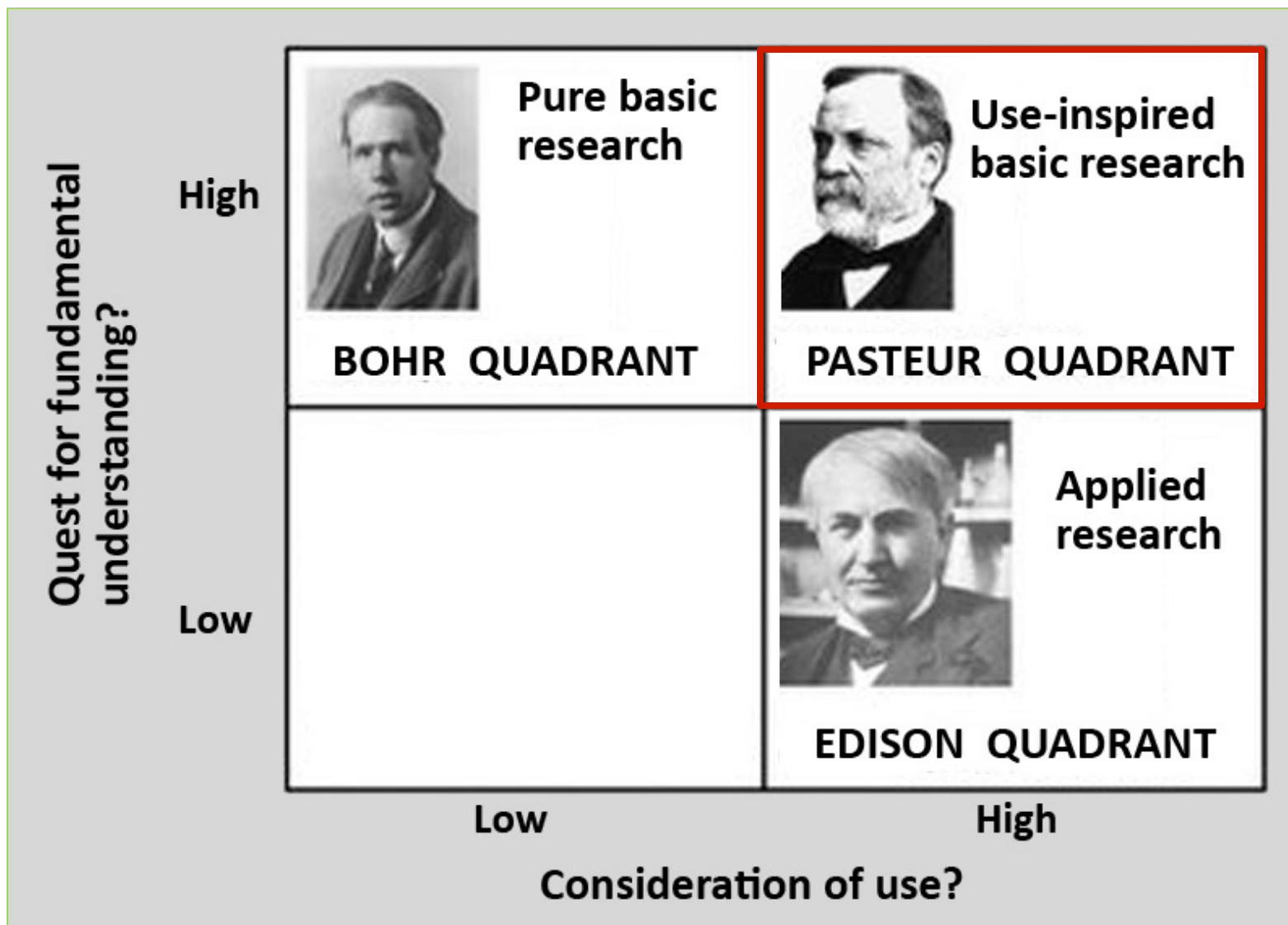
There is not pure science and applied science but only science and the application of science (Louis Pasteur 1863)



ESP Aligns with Pasteur's Quadrant – Use Inspired Basic Research



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“In order to enhance the broader applicability and **transferability of this research, linkages** within and between universities; research centers; state, local, and tribal governments; community organizations; federal agencies and national labs; and private organizations are encouraged.

Engaging partners and stakeholders in the early phases of problem identification and definitioncan lead to novel paths of scientific inquiry and facilitate application of new scientific insights.”



➤ Early Engagement:

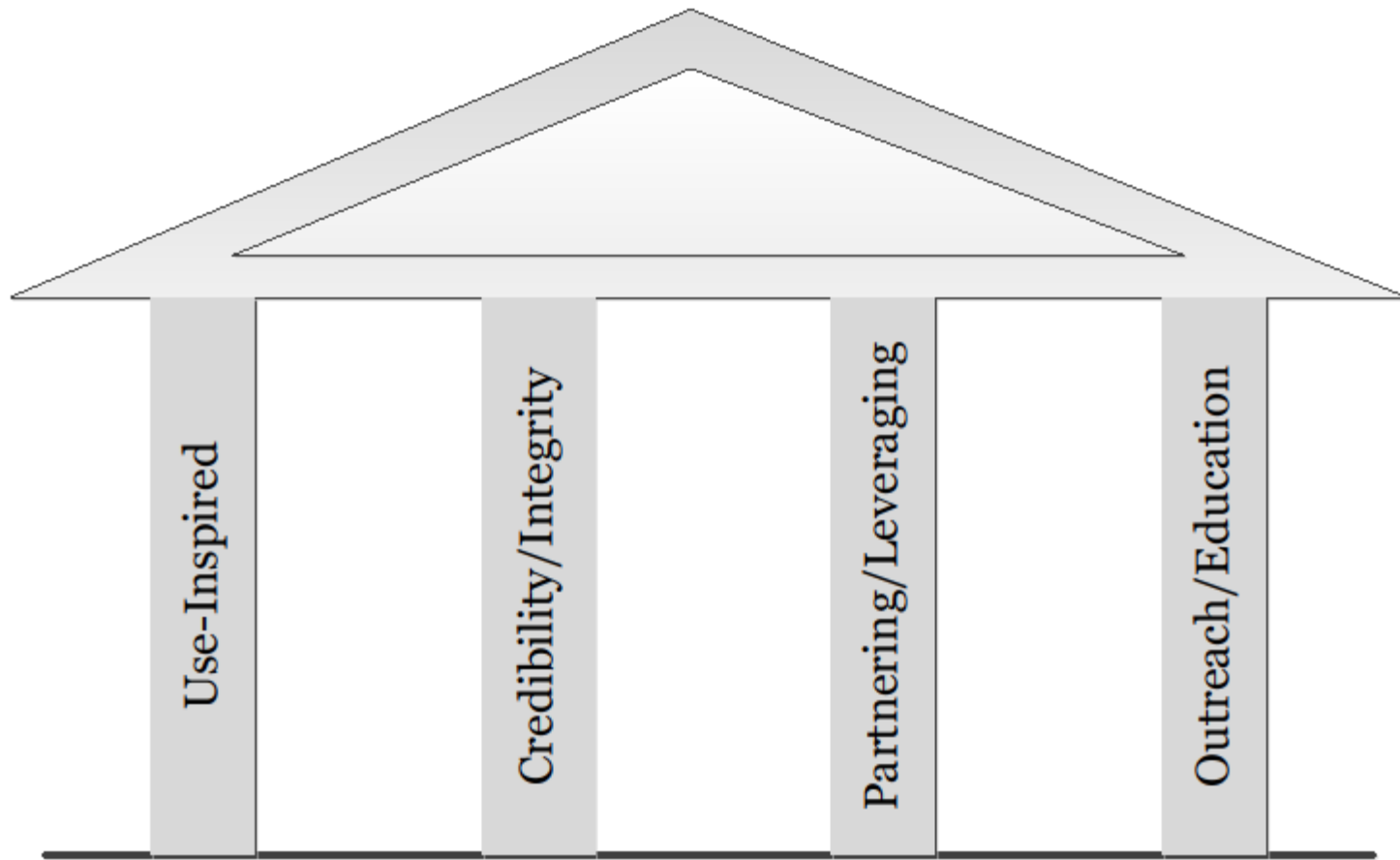
- Partners (both public and private)
- Stakeholders

➤ Some of our greatest knowledge arose from these linkages:

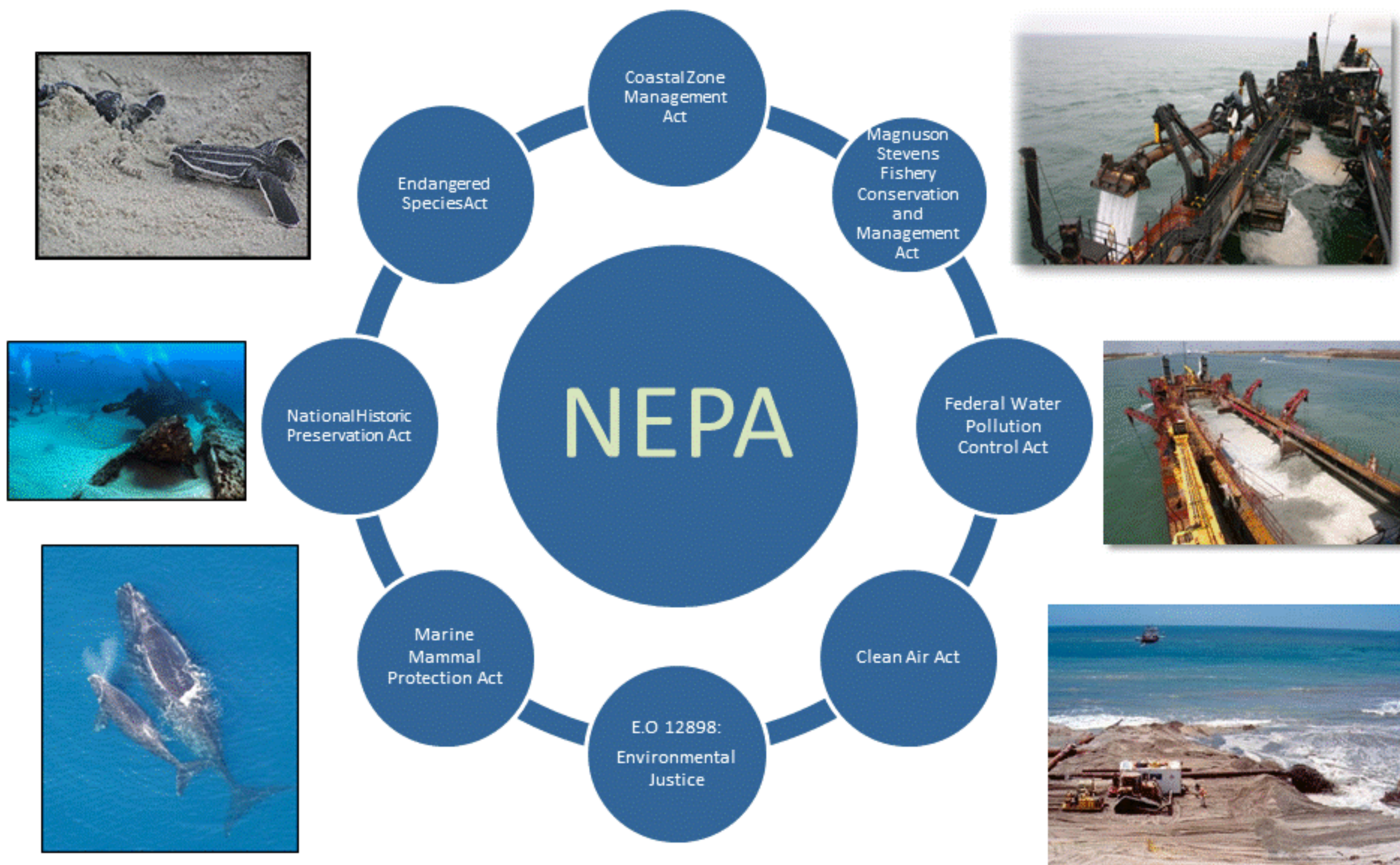
- Discoveries of deep-water communities in the Gulf in partnership with federal and private sectors
- Studying bowhead whale migration and subsistence hunting based on Inupiat traditional knowledge
- Trimming of wind energy areas by studying ocean use by avian species in partnership with FWS
- Etc.



The Pillars of Environmental Studies Program



Environmental Review



- Promote Stewardship through scientific **discovery** and **application**
- Keep asking the tough “**use-inspired**” questions
- Consider future aspects of science with an emphasis on social well-being and **societal benefits**
- This broader time-scale should involve more attention placed on appropriate *Long –Term Environmental Monitoring for the future and make better use of data sets collected over the past 40 years*

12 years of Partnership Studies with OER

Start

Date:

2004 WWII Shipwreck Study: **Archaeological and Biological Analysis of World War II
Deepwater Shipwrecks in the Gulf of Mexico**

2005 “Chemo III:” *Investigations of Chemosynthetic Communities on the Lower Continental Slope of the Gulf
of Mexico*

2008 “Lophelia II:” *Exploration and Research of Northern Gulf of Mexico Deepwater Natural and
Artificial Hard Bottom Habitats with Emphasis on Coral Communities: Reefs, Rigs and
Wrecks*

2010 Atlantic Canyons: *Exploration and Research of Mid-Atlantic Deepwater Hard Bottom Habitats and
Shipwrecks with Emphasis on Canyons and Coral Communities*

2017...

What is National Oceanographic Partnership Program (NOPP)

*Long-term interagency, inter-sector collaboration
motivated by common needs*

The NOPP Approach

Identify areas of **ocean science research** and **education** that are important to two or more funding entities and that would most benefit from a partnership approach

Value Proposition

Working together achieves more, and does so more efficiently, than working alone



NOPP Legislation

The **1997 Defense Authorization Act** established the **National Oceanographic Partnership Program (NOPP)** for two purposes:

- To promote national goals of assuring national security, advancing economic development, protecting quality of life, and strengthening science education and communication through improved knowledge of the ocean; and
- To coordinate and strengthen oceanographic efforts in support of those goals by:
 - a) Identifying and carrying out partnerships among federal agencies, academia, industry, and other members of the oceanographic scientific community in the areas of data, resources, education, and communication, and
 - b) Reporting annually to Congress on the Program.



WWII Shipwreck Study

- First major NOPP-sponsored study utilizing partnership with NOAA OE.
- Six World War II era shipwrecks in the north-central portion of the Gulf of Mexico
- Exploration as historic properties but including a biological component to assist management decisions regarding future decommissioning of platforms in deepwater. “Do manmade structures, such as shipwrecks, function as artificial reefs in deep water?”



Gulfpenn 550 m



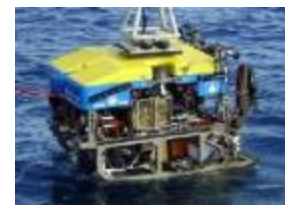
U-166 deck gun 1,524 m



Halo 143 m



- Management-decision need to study information gap related to sensitive biological communities deeper than 1,000 m
- Continued emphasis on emerging significance of deep-water corals
- Multidisciplinary: bacteria to megafauna
- Significant discoveries of new habitat types, more than 100 new species, 24 potential new genera, distributions, extensive coral habitats.
- Four field efforts 2006-2007 including *Alvin*, *Jason II* ROV and AUV



New species of chemosynthetic tube worm



Madrepora GC854,
1,450 m

Lophelia II

- Management information needs for additional work on deepwater coral
- Five cruises 2008-2012 including use of *Jason II* ROV, *Sentry* AUV, and *Kraken II* ROV
- New shallow and deep records of growth for *Lophelia* coral on deepwater platforms
- Remarkable discovery and exploration of deep shipwrecks
- Initial discovery of impacted deep water corals from DWH spill



Lophelia along tension leg of Joliet TLP



Newly discovered 1800's wreck, 7,500 ft depth

Atlantic Canyons

- Designed to provide information for future management decisions regarding consideration of potential oil and gas leasing and development in the Atlantic region
- Seven cruise legs and 90 at-sea days, 414 hours of ROV dives were made and 6,406 km² were mapped using *Jason II* and *Kraken II* ROVs
- Discovery of *Lophelia* coral for first time in Norfolk Canyon
- Discovery of extensive chemosynthetic mussel habitat near Norfolk Canyon
- Unexpected high density of deepwater corals in many areas
- Discovery and survey of all 1921 “Billy Mitchell Fleet”



- Six prestigious awards for previous four partnerships from the Department of the Interior and NOPP.
 - Two projects the only ones to have received both awards
- Two documentary videos produced and publically available.
 - Lophelia II
 - Pathways to the Abyss (Atlantic Canyons)
- 11 expedition web pages are permanently available on NOAA's Ocean Explorer web site
- Dozens of peer-reviewed scientific journal articles have been published.
- Science resulting from the studies has been directly used for management decisions to protect sensitive ecosystems of the Gulf of Mexico and the Atlantic.

Anticipated Continued collaboration with NOAA OER (and USGS)

- Ongoing development of a new study to investigate new Mid- and South Atlantic priority areas possessing canyons, hard bottoms, and seep habitats likely to support undiscovered deepwater benthic communities.
- Science will lead to both discoveries of new habitats and an improved understanding of disturbance sensitivity.
- Study would improve understanding of the functional role of benthic habitats within the wider Atlantic ecosystem and inform near-term and future management decisions regarding its balanced stewardship.

Successful Partnering by Realization of both Agency's Missions

Examples

Use-Inspired Information needs



Exploration and Discovery

- Chemo III and Lophelia II: Both contributed to adaptive management of resources
- Regulatory “Notice to Lessees” was modified on multiple occasions using science results to protect sensitive habitats
- Atlantic Canyons study results utilized for recommendation to NOAA for fishing closures in Mid-Atlantic by MAFMC
- Management decisions regarding consideration of potential oil and gas leasing and development in the Atlantic region
- More than 100 new species discovered during Chemo III alone
- First observations and documentation of Gulf of Mexico shipwrecks back to the 1800s.
- First documentation and study of historical Atlantic “Billy Mitchel” fleet of 1921
- Discovery of the largest methanotrophic chemosynthetic community on the Atlantic coast (from previous NOAA OER bubble plume discovery)
- Record *Lophelia* observations on all study platforms in Gulf of Mexico including growth rates and shallow and deep depth records.

Rationale for continuing research in Mid- and south-Atlantic

- Higher potential for future leasing
- Canyons to north fully mapped and most explored (potential mitigations better understood)
- Several deep canyon systems south of Virginia undocumented (e.g. Hatteras, Pamlico)
- Broad ecosystem data gaps;
 - unmapped and unexplored deepwater coral habitats (*Lophelia*)
 - Further exploration of gas seep origins and likely chemosynthetic communities needed
- Need improvement of predictive models for mid- and south Atlantic

